

Review of the Empirical Literature on Managerial Attention

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Abstract

The attention-based view (Ocasio 1997) enables scholars to explain differences in organizational performance by examining the cognitive mechanisms of organizational decision makers. However, we still have not established valid as well as reliable approaches to operationalize the attention of decision makers. In this manuscript, we aim to identify progress and future challenges for the operationalization of attention of decision makers by reviewing prior empirical work on the attention-based view. We emphasize the importance of employing measures of attention that capture alternative loci of attention in a mutually exclusive and collectively exhaustive manner. We also argue that we should avoid applying the attention-based view to the level of groups of individuals because the theory is built on the concept of the bounded rationality of an individual.

Key words: Attention, operationalization, the behavioral theory of the firm

I. Introduction

Research on the attention-based view (Ocasio 1997), which aims to explain behaviors and performance of organizations by closely examining attention of organizational decision makers, is expected to enable scholars to adopt a unique perspective to understand various organizational phenomena. By employing this unique view, scholars can examine cognitive mechanisms of decision makers, which otherwise are difficult to observe from outside. This is important because scholars may be able to untangle the core decision-making processes of organizations. However, precisely operationalizing the locus of the attention of decision makers is not always

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easy. It is rare that even decision makers themselves explicitly recognize the mechanisms or rationales of their decision making, while a high degree of objectivity (or the possibility of replication) is required for independent observers.

Accordingly, our purpose in this manuscript is to review efforts by prior research to operationalize the attention of organizational decision makers and to discuss implications for future research. Specifically, we critically examine various approaches used by prior work to operationalize the locus of the attention of decision makers to show some directions for more refined approaches for measuring attention. Accordingly, our research questions in this manuscript address various approaches employed by the prior research to operationalize the locus of the attention of decision makers, advantages and shortcomings of those approaches, as well as future efforts toward more precise operationalization of the locus of the attention of decision makers.

II. Methodology of the literature review

The source of the attention-based view (Ocasio 1997) is the behavioral theory of the firm, or BTOF (Cyert and March 1963). One of the distinguishing features of the BTOF is that the authors characterize organizational decision makers as boundedly rational in that their cognitive capacity is limited. An important implication of this characterization of decision makers is that the allocation of such important cognitive capacity on various issues, or the prioritization of those issues, critically influences subsequent decisions and accordingly behaviors and performance of organizations. In other words, once decision makers judge that particular areas or fields are worth only their secondary attention, the issues within those areas and fields are not seriously recognized or acted upon no matter how important these issues are from the perspective of objective observers. Therefore, organizations facing more or less identical competitive situations could perform differently depending on the approaches of their decision makers to allocate their cognitive capacity across various issues.

Most of the questions examined by organizational scholars are concerned with the mechanisms or rationales underlying differences in organizational performance. Some advocate positions of organizations in their competitive contexts as key determinants of their competitiveness (Porter 1980). Others argue for the importance of resources possessed by organizations (Barney 2002, Teece 1982). The emphasis Cyert and March (1963) place on the importance of the cognitive capacity of decision makers indicates an alternative perspective that pays closer attention to the role of the cognitive mechanisms of decision makers. Their perspective shows the possibility that efforts of decision makers to more appropriately prioritize issues that com-

pete for their attention determine competitiveness and therefore the destiny of their organizations.

Extending their argument, Ocasio (1997) proposes the importance of attention as a theoretical construct. This construct describes the situation in which decision makers focus their cognitive capacity on particular issues. The locus of attention of decision makers is useful as a theoretical construct because it parsimoniously describes the process of cognitive capacity allocation and its consequences. Accordingly, Ocasio (1997) argues that managerial attention should be paid close interest by organizational scholars as an important determinant of organizational performance.

According to Ocasio (1997), attention encompasses “*the noticing, encoding, interpreting, and focusing of time and effort by organizational decision-makers on both (a) issues; the available repertoire of categories for making sense of the environment: problems, opportunities, and threats; and (b) answers: the available repertoire of action alternatives: proposals, routines, projects, programs, and procedures*” (p.189). As this definition clearly shows, the attention of decision makers regulates how they recognize their organizations and competitive environment, consequently affecting the behavioral alternatives adopted. Put differently, attention is defined as the principles underlying the decision-making processes of decision makers. The straightforward consequence of this definition is that the locus of the attention of decision makers strongly influences organizational performance.

One may criticize that this perspective is excessively reductive, or too simple, in that it is assumed that the decision-making characteristics of a limited number of decision makers explain differences in organizational performance. As we reviewed above, BTOF aims to take account of those aspects of organizational phenomena that economic rationality, or the maximization of the economic benefits of organizations, does not necessarily explain. One conceptual tool to achieve this goal is bounded rationality. Although the attention-based view shares with BOTF the same foundational principle that the rationality of decision makers is bounded, one may notice substantial differences between them in terms of their orientation toward theoretical parsimoniousness. On the one hand, the attention-based view runs the risk of excessively simplifying the complexity associated with various organizational phenomena by employing simple causal relationships between the locus of the attention of decision makers and organizational performance. On the other hand, it may be possible to examine the essence of the organizational phenomena effectively exactly because the view simplifies these causal relationships. This potential is the reason why many scholars have responded to the proposal of Ocasio (1997), accumulating a rich body of research called the attention-based view. The question we aim to address in this manuscript concerning how we can more precisely and reliably

operationalize the locus of the attention of decision makers is one piece among various efforts toward realizing this potential.

Since his seminal article published in 1997, Ocasio has been actively leading initiatives of the attention-based view. We therefore focus our examination of the operationalization approaches employed by prior researchers on the empirical works reviewed in Ocasio (2011). More recent works are also reviewed as appropriate.

We can examine operationalization approaches from two perspectives: the locus of attention and the intensity of attention. The former refers to characteristics of issues and objects attended to by decision makers, while the latter is concerned with the amount and strength of attention. As for the former, scholars have examined a wide variety of loci of attention that best satisfy their theoretical interests. They also adopt various measures unique to their respective choice of the locus of attention. By contrast, the latter, or the intensity of attention, is operationalized by more or less similar measures even though the loci of attention are different. Accordingly, we focus our examination on the intensity of attention because we believe it more useful for future efforts by researchers.

Given that the central interest of the attention-based view is to relate attention to organizational performance, most prior work employs some measure of attention as an independent variable and tries to associate it with a measure of organizational performance as the dependent variable (Eggers and Kaplan 2009, Nadkarni and Barr 2008, Kabanoff and Brown 2008, Kaplan 2008, Bouquet, Morrison and Birkinshaw 2009). Another typical stream of works aim to address theoretical interest in the formation process of influential attention by employing some measure of attention as the dependent variable to uncover what determines the intensity of attention to particular issues and objects (Bouquet and Birkinshaw 2008, Tuggle, Schnatterly and Johnson 2010, Stevens et al. 2015, Sucheta and Jianhong 2014, Monteiro 2015). These two research perspectives are separately pursued, although they are mutually related. However, it is argued that one of the important determinants of attention is the characteristics of decision makers (Hung 2005, Tuggle et al. 2010, Stevens et al. 2015) in addition to the characteristics of the issues and objects attended to, thereby suggesting that the characteristics of decision makers influence organizational performance as well. Put differently, it is conceivable that the attention of decision makers is endogenously determined. Unfortunately, no prior work has seriously addressed this issue so far. This lack of prior work is understandable because appropriate examinations of the potential endogeneity of attention call for a deeper understanding of the determinants of attention. It is therefore necessary to cautiously examine the inferences of empirical analyses of the associations between attention and organizational performance with this potential endogeneity in mind.

III. Some major approaches to operationalize attention

1. Subjective evaluation

One typical approach is to survey decision makers to uncover the extent to which they allocate their attention to certain issues and objects. One can most directly operationalize the attention of decision makers with this approach. Researchers should have some *a priori* understanding (or expectation) of the possible loci of attention before they prepare survey questions about the actual allocation of attention by decision makers. The obvious advantage of this approach is that one can directly operationalize the attention of decision makers, while enlarging the sample size can be challenging because researchers need to have direct access to decision makers. This is particularly problematic when the theoretical interests of researchers are to uncover temporal shifts or changes in attention because observing the same decision makers for longitudinal analyses is almost impossible. Realistically speaking, this approach is therefore only valid for cross-sectional analyses. It is an appropriate operationalization approach for examining differences in attention across decision makers or organizations rather than temporal shifts or changes in attention.

Another shortcoming of this approach is that one can operationalize attention only to the extent that they can anticipate it beforehand because decision makers are asked to choose from several alternative loci of attention prepared by researchers. For example, prior work adopts this survey approach to operationalize attention to foreign subsidiaries (Bouquet and Birkinshaw 2008), international issues and objects (Bouquet et al. 2009), an opportunity aspect or a threat aspect of particular events (Barreto and Patient 2013), and social goals (Stevens et al. 2015). It is possible to properly operationalize the existence and intensity of attention because decision makers themselves reflect upon their own loci as well as the intensity of attention, while the relative importance of those loci of attention in comparison with other issues and objects as alternative loci of attention (for example, domestic subsidiaries, domestic issues, or other events) is not considered.

In other words, these alternative loci of attention are excluded from the examination when researchers prepare survey questions. Given that the allocation of limited cognitive capacity, or attention, is a cornerstone of the attention-based view, it is therefore appropriate to carefully examine the validity of cherry-picking some loci of attention according to the theoretical interests of researchers and thereby virtually ignoring the overall allocation of attention. This is particularly troubling because the survey approach is typically adopted for making cross-sectional comparisons across decision makers or organizations rather than examining temporal shifts and changes in the attention of identical decision makers. For example, consider the case of researchers observing a comparable degree of the intensity of attention to a particular

issue for Organization A and Organization B. One may want to conclude that Organization A and Organization B attend to the issue to the same extent; however, this conclusion could be inappropriate if Organization A recognizes the issue as the most critical for it, while Organization B sees the issue as just one of many important issues. Therefore, it is advisable to follow Stevens et al. (2015), who operationalize attention with a relative measure that lets decision makers recognize alternative loci of attention and examine the relative importance of the focal locus.

It also is possible that the framing of survey questions may also be a source of bias. This is a concern of the survey approach in general, but the appropriately framing questions is critically important to ensure the validity of analyses. Therefore, it is important to employ survey questions with a high degree of validity established by prior work. The challenge for researchers is that highly reliable survey questions are limited because replication studies that aim to ensure the validity of survey questions are limited as well.

2. Oral or written expression

Researchers also try to operationalize attention of decision makers by analyzing their speeches or written expression, most typically recorded in letters to shareholders in annual reports (Bouquet and Birkinshaw 2008, Nadkarni and Barr 2008, Eggers and Kaplan 2009, Kabanoff and Brown 2008, Kaplan 2008). For example, Sucheta and Jianhong (2014) argue that they can operationalize the temporal orientation of decision makers, or whether decision makers attend to the past, present, or future when they consider their businesses, by analyzing the choices of words by decision makers in annual reports. Nadkarni and Barr (2008) similarly analyze annual reports to examine which aspects of environmental factors are attended to by decision makers, including the “task sector,” which *“includes those aspects of the environment that have direct transactions with the firm such as competitors, suppliers, and customers”* (p.1398), and the “general sector,” or *“more macro-level dimensions such as social, demographic, economic, and political”* (ibid.). Another example of an approach that relies on the speeches or written expression of decision makers is Kabanoff and Brown (2008), who try to uncover the strategic types such as prospectors or defenders (Miles et al. 1978) adopted by decision makers by analyzing discussions by decision makers on issues closely associated with each strategic type.

These works are noteworthy in that they treat alternative choices of possible loci of attention as mutually exclusive and collectively exhaustive so that no possible locus of attention is ignored. On the contrary, other researchers define particular locus of attention of their theoretical interests *a priori* before they try to operationalize the existence and intensity of those loci of attention. Some of the examined at-

tention include attention to optics (Kaplan 2008), emerging technology and affected industries (Eggers and Kaplan 2009), and Clinton's healthcare reform (Nigam and Ocasio 2010). This approach of operationalizing the attention of decision makers suffers from the possibility that alternative loci of attention beyond the expectations of researchers are excluded from the examination. Although substantial attention is likely to be allocated to new technologies other than optics, existing technologies, or alternative policy agendas unrelated to the healthcare reform, these alternative loci of attention are ignored when researchers operationalize attention. Consequently, it is difficult to properly examine the degree of the intensity of attention, particularly in comparison with alternative loci of attention. Accordingly, it is important to operationalize the focal attention by taking account of the possibilities of alternative loci of attention.

The strategic type framework employed by Kabanoff and Brown (2008) is originally proposed by Miles et al. (1978). It is so well known that it is widely employed beyond the context of the attention-based view and its validity is well established. It is therefore an appropriate approach to operationalize the strategic orientations of organizations in empirical analyses of large sample data. By employing codified data including annual reports, one can operationalize the strategic types of many organizations for longitudinal periods, as it is possible to leverage data in a highly standardized format. With this operationalization approach, one can expect to efficiently increase the sample size because not only cross-sectional differences, but also temporal shifts and changes can be examined. By contrast, the validity of operationalization depends on researchers' choices of keywords extracted for the analyses. Therefore, one needs to carefully select appropriate keywords by building on prior work.

One possible shortcoming associated with operationalizing attention with oral or written expression is concerned with the extent to which it precisely represents the attention of decision makers. For example, given that annual reports are prepared only once a year and letters to shareholders are relatively brief, these materials may not fully capture the attention of decision makers. It may also be naïve to expect decision makers to disclose their strategic considerations in materials made available to the public (including their competitors) such as annual reports. Moreover, senior managers often ask their staff to write letters to shareholders on their behalf, and thus the contents of those materials may not precisely represent the real attention of decision makers. Fortunately, Duriau, Reger, and Pfarrer (2007) address most of these concerns and criticisms. However, while most researchers agree on the validity of operationalizing the attention of decision makers by using annual reports, it is still necessary for each researcher to pay careful attention to ensure the validity of their measures of attention in their respective empirical contexts.

3. Induced actions

The next approach we discuss is operationalizing attention of decision makers by examining subsequent behaviors expected as a consequence of the focal attention, or actions induced by the attention. For example, it is safe to consider responses to requests for advice posted on a knowledge-sharing website as an indication of attention to such requests (Haas, Criscuolo and George 2015). It should also be possible to conclude that board members who spend a substantial amount of their meeting discussing new products or emerging markets are highly likely to focus their attention on new products or emerging markets (Tuggle et al. 2010). Joseph and Ocasio (2012) analyze the minutes of discussions among senior managers to operationalize the loci of attention of those managers. Likewise, when the Federal Aviation Administration establishes new rules and standards on the operation of airplanes, it should focus its attention on the problems or potential accidents addressed by such rules and standards (Sullivan 2010). Other examples of induced actions employed to operationalize attention include responses to proposals of a potential technology transfer (Monteiro 2015), reviews by film critics (Hsu 2006), and access to a knowledge-sharing database (Hansen and Haas 2001).

As these examples from prior work indicate, researchers frequently employ this approach to operationalize the attention of a group of decision makers rather than an individual decision maker. This may occur when theoretical interest is placed on the examination of a group of decision makers rather than an individual or when a survey or analysis of written or oral expression is simply too difficult. In short, this approach is employed as an alternative to the more direct operationalization approach discussed above.

One potential shortcoming of this operationalization approach is that researchers fail to observe attention that does not induce subsequent behaviors, because researchers measure subsequent behaviors closely associated with the focal attention, but do not directly measure the focal attention *per se*. For example, in the case of Haas et al. (2015) discussed above, the attention to the responded requests for advice should be properly measured, but the attention to requests not responded to, for example because of the lack of appropriate advice, is not observed at all.

One may argue that it is not appropriate to be excessively concerned about this potential shortcoming because this operationalization approach is considered to be conservative in that it is difficult to deny the existence of attention as long as subsequent behaviors are observed. However, this may not necessarily be the case. Consider, for example, the case of respondents who happen to have good advice to offer. Although such respondents may have only a casual interest in the requests, they are assumed to have attended to the requests. Furthermore, given the underlying assumption that attention is a consequence of the selective allocation of limited cogni-

tive capacity, by conservatively operationalizing some loci of attention, one may risk overestimating the intensity of attention on the alternative loci. The argument for a conservative operationalization captures only one aspect of this approach. Whether the potential bias arising from indirectly operationalizing attention outweighs the benefits of employing relatively easily observable data depends on respective contexts of the empirical examination. However, it should not be appropriate to tolerate such bias just because this operationalization approach is conservative. It is apparent that this approach is valid only to the extent that attention is closely associated with subsequent behaviors. Accordingly, it is critical to ensure that the association between a particular attention and subsequent behaviors is highly robust.

Another critique of equating behaviors with attention is that this approach endangers the essential value-added of the attention-based view, or the emphasis on the cognitive mechanisms of decision makers. Operationalizing attention by subsequent behaviors may contradict one of the principle arguments of the attention-based view, which emphasizes the importance of closely examining influences of cognition. Put differently, researchers can virtually avoid difficulties associated with operationalizing attention by abandoning the foundational perspective of the attention-based view, which rests on the clear distinction between attention and associated behaviors, thereby risking their theoretical consistency. Each researcher should therefore carefully examine whether the benefits expected from easier operationalization outweigh the problems associated with theoretical inconsistency in their respective empirical contexts.

Other researchers adopt a related approach to infer the association between attention and subsequent behaviors by employing theoretical causality between them. For example, Greve (2008) infers shifts in the locus of the attention of decision makers from shifts in their reference points (Cyert and March 1963, March and Shapira 1992). He builds his arguments on the assumption that issues and objects closely related to organizational growth rate are the reference points adopted by decision makers to evaluate organizational performance. In other words, he interprets shifts in reference points as shifts in the locus of attention by employing a theoretical proposition that organizational performance (or more precisely, the subsequent behaviors of organizations) depends on the decisions characterized by the reference points attended to by decision makers. Likewise, Thornton and Ocasio (1999) infer the attention of decision makers to institutional logics by analyzing the determinants of executive succession in the higher education publishing industry. They argue that because decision makers attended to the editorial logic rather than the market logic, executive succession is determined by organizational size and structure rather than by the product market and market for corporate control.

There can be several shortcomings associated with the approach to infer attention by employing theoretical causality. Firstly, it is hard to deny the influence of prior organizational performance on subsequent behaviors because the underlying theory of Greve (2008), or the theory of performance feedback, is widely validated by empirical studies. However, some may argue that the degree of robustness established for the theory of performance feedback is still not high enough as a basis upon which one can argue for shifts in attention. For example, some important aspects of the theory are still under active discussion, including the choice of reference points attended to by decision makers, subsequent behaviors motivated by performance feedback, and form of the relationship between performance feedback and subsequent behaviors. Furthermore, we have to question the validity of attention to reference points *per se* in case the associations between the performance feedback and subsequent behaviors of organizations turn out to be spurious correlation, rather than causal relationship. Given that the primary goal of the theory of performance feedback is to prove the associations between the reference points and behaviors of organizations, we have to carefully examine the logical reasoning of arguing for shifts in attention under the assumption that the reference points and subsequent behaviors of organizations are associated. As for Thornton and Ocasio (1999), their argument assumes the validity of the normative model that executive succession should be determined by objective assessment by decision makers of their competitive environment. The validity of this assumption is worth careful reexamination, however, because the authors ignore the complexity of executive succession decisions, including individual interests and political considerations. As in the case of Greve (2008), a spurious correlation is also concerned. Furthermore, even if the determinants uncovered by Thornton and Ocasio (1999) actually influenced decisions on executive succession, there is no guarantee that executives were the ones who made the decision. It is obvious that the more robust the association between attention and behaviors adopted as an operationalizing measure of attention, the more ideal. Therefore, the major concern associated with operationalizing attention with subsequent behaviors is the robustness of the focal association.

4. Outside influences

The prior work discussed above focuses their observation on decision makers themselves. However, there are a limited number of exceptions. Specifically, some researchers try to operationalize attention of decision makers by examining behaviors of actors who exert influences on decision makers. One good example is Hoffman and Ocasio (2001), who operationalize industry-wide attention to particular events by counting articles published in industry papers. It is conceivable that the events covered by the industry papers are of major interest to industry participants.

Furthermore, coverage by industry papers may reinforce industry-wide attention.

Although few researchers adopt this operationalization approach to examine actors who influence focal decision makers in establishing and maintaining their attention, the approach seems to be promising for some reasons. Firstly, researchers can avoid the risk of unintentionally excluding some alternative loci of attention from their examination because they do not define *a priori* possible loci of attention. It is also possible to avoid concerns about the robustness of the associations between attention and subsequent behaviors because no behaviors of decision makers are equated with their attention.

However, one obvious shortcoming is associated with this approach. Namely, the frequency and intensity of the media coverage of particular events depend on the editorial policies of the media rather than the intensity of the attention of decision makers themselves. In particular, given the nature of industry papers to focus on new issues and events, widely known issues and events are less likely to be frequently covered no matter how intensively they are attended to by focal decision makers. Furthermore, it is impossible to operationalize differences across industry participants. The approach is appropriate to operationalize temporal shifts in industry-wide attention, but inappropriate to examine cross-sectional differences. In other words, it is difficult to employ this operationalization approach for a wide variety of empirical contexts. Nonetheless, it can be useful for researchers to avoid the shortcomings associated with alternative operationalization approaches that focus on subjective evaluation or induced actions. Researchers may therefore want to consider this approach when their theoretical interests do not focus on cross-sectional comparisons as long as they can choose media outlets whose bias in editorial policy can be minimized.

IV. Advantages and shortcomings of each operationalization approach

The major question we are concerned with in this manuscript is the extent to which we can precisely operationalize the cognitive mechanisms of decision makers. We can further decompose the question into one on construct validity and another on theoretical validity. The latter is concerned with the theoretical implications of extending the subjects of our examinations beyond individuals.

1. Construct validity

Construct validity is a particularly major problem when we operationalize attention by subsequent behaviors. However, it can also be a problem even when we employ subjective measures or archival records of oral or written expressions by decision makers themselves. The extent to which we can minimize the bias in opera-

tionalization depends on the framing of survey questions or choice of keywords extracted from archival records. In short, it is difficult to avoid concerns of potentially biased operationalization no matter which operationalization approach we employ, while we should define observed attention *a priori*.

In other words, it is difficult to operationalize attention unless researchers have some hypotheses on alternative loci of attention. As our review above shows, it is impossible to operationalize the attention of all decision makers as a whole simply because we still do not have an operationalization approach to do so. Although there are critical differences between defining the particular attention of researchers' theoretical interests *a priori* and designing questions so that alternative loci of attention are included in a mutually exclusive and collectively exhaustive manner, researchers should still decide and define which locus of attention should be examined as their primary interest. As long as researchers should define the observed attention *a priori*, the alternative loci of attention excluded from their definition inevitably elude observation. Researchers should keep asking themselves whether they have operationalized attention precisely.

2. Theoretical validity

In addition to issues of construct validity, we should also note issues concerning theoretical validity. More specifically, any operationalization we employ should clearly distinguish attention as a consequence of the selective and competitive allocation of limited cognitive capacity from a related, but more straightforward construct of cognition. A theoretical construct of attention is built on the assumption that the focal issues or objects compete for the limited cognitive capacity of decision makers against alternative loci of attention. Accordingly, the construct means more than the fact that decision makers recognize the focal issues and objects. As we reviewed above, some operationalization approaches found in prior work fail to properly build on such a theoretical foundation. Further efforts toward more valid operationalization of attention should be informed by this theoretical understanding.

Another issue concerning theoretical validity is that the operationalizing attention of a group of individuals, including senior management teams and the industry as a whole, may be worth careful reexamination. We note above that theoretical basis of the attention-based view is the bounded rationality of decision makers. Because the unit of analysis for the theory of bounded rationality is an individual, it is not immediately apparent whether it is appropriate to apply this theory to groups of individuals, like senior management teams, or even to groups of organizations or industries. Given that it remains unclear whether the rationality of senior management teams, organizations, or industries is bounded, one may want to carefully examine whether it is theoretically meaningful to argue attention of groups of individuals.

It is meaningful to examine the major locus of the attention of decision makers because they may not properly recognize some alternative loci of attention as they are boundedly rational. Ideally speaking, we should focus our application of the attention-based view on individuals who could critically influence organizational decisions, including CEOs and founders, particularly when we try to explain differences in organizational performance based on differences in the loci of attention of decision makers. What one can examine at the level of groups of individuals, including senior management teams, organizations, and industries, is simply the existence and intensity of recognition, which should be clearly distinguished from attention as a consequence of the selective allocation of limited cognitive capacity. Recognition by senior managers or organizations as a determinant of organizational performance has already been discussed in upper echelons theory (Hambrick and Mason 1984, Hambrick 2007). It may be more theoretically consistent and productive to examine attention at the level of senior managers as an extension of upper echelons theory than apply the attention-based view directly.

V. Implications for future research on attention

In this concluding section, we discuss some of the implications of our review of prior work for future research on attention. Firstly, it is critical to employ survey questions or keywords (used for archival data analyses) validated by prior work to ensure a high degree of construct validity. Unless one satisfies the construct validity of their measures of attention, their choice of operationalization of attention cannot be valid. Unfortunately, it is extremely difficult to directly operationalize attention of decision makers no matter how sophisticated an operationalization approach one employs. The next best alternative is to examine induced behaviors or keywords closely associated with the focal attention. Accordingly, it is critical to ensure the validity of such associations by relying on the efforts of prior work. However, our choice of validated survey questions or keywords is limited. Therefore, it is important to encourage efforts to replicate prior trials with new survey questions or keywords to expand the available stock of validated operationalization tools for attention of decision makers.

Another important implication of our review of prior work is that we should ensure a high degree of the theoretical validity of our operationalization measures by taking account of alternative loci of attention in a mutually exclusive and collectively exhaustive manner rather than by defining the particular attention of researchers' theoretical interests. The theoretical construct of attention is important and meaningful because it is an indication of the selective allocation process of limited cognitive capacity. Put differently, it is meaningless to operationalize the intensity of

a particular locus of attention without properly taking account of such an allocation process of cognitive capacity.

Operationalizing a particular locus of attention, without considering relative intensity in comparison with alternative loci of attention, simply captures the fact that the focal issues or objects are the locus of recognition rather than the locus of attention as defined in the context of the attention-based view. Paying attention to certain issues or objects means removing cognitive capacity from alternative loci of attention. In other words, a core argument of the attention-based view is that we can explain differences in organizational performance by examining the locus of attention of decision makers, or by examining which alternative issues and objects decision makers selectively exclude from their scope of attention. Accordingly, our efforts to operationalize attention should reflect the fact that it is established by taking a share of cognitive capacity away from alternative loci of attention by employing operationalization measures that capture such alternative loci of attention in a mutually exclusive and collectively exhaustive manner.

Furthermore, we should go beyond simply counting the absolute frequency of keywords or written expressions to measure the intensity of the focal attention by considering relative measures of intensity in comparison with alternative loci of attention. Ideally, we should first operationalize total amount of available attention and then quantify the share of attention allocated to the focal locus; however, such an approach to quantify attention or information-processing capacity is not yet available. The best alternative is therefore to employ a relative measure of attention intensity.

Finally, it seems to be important to focus our application of the attention-based view on individual decision makers. Given that an underlying assumption of the attention-based view is bounded rationality observed at the level of an individual, it should be appropriate to carefully examine the validity of applying the theory to groups of individuals. We still do not understand how (and whether) we should consider bounded rationality at the level of groups of individuals. Some may argue for the total sum of cognitive capacity possessed by all members of the group. Some cognitive capacity may also be shared by the whole group. It may also be more productive to employ the theory of upper echelons (Hambrick and Mason 1984, Carpenter, Geletkanycz and Sanders 2004) rather than the attention-based view when the theoretical interests of researchers are on examining the associations between cognition at the level of senior management teams and organizational performance.

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